CLAIMS

What is claimed is:

1. An apparatus for allocating a processing resources to functions in a queue waiting to be executed, comprising:

a capacity determining means for determining an amount of the processor resource available to be assigned;

a load determining means for determining an estimate of an amount of the resource needed for each function waiting in the queue to execute;

a prioritization means for prioritizing each of the functions in a queue waiting to be executed; and

an allocating means, which receives information from said capacity determining means, said load determining means, and said prioritization means, for allocating the available resource to the functions based on a hierarchical priority scheme.

2. The apparatus of claim 1, wherein:

the functions are decomposed elements of a more complex process and do not require the same amount of resource to execute.

3. The apparatus of claim 2, wherein:

multiple instances of any function within the process may be invoked by the processor to execute concurrently.

4. The apparatus of claim 3, wherein:

each of the functions within the process is assigned a separate priority within the hierarchical priority scheme.

5. The apparatus of claim 4, wherein:

each instance of each function within the process is assigned a separate priority within the hierarchical priority scheme.

6. The apparatus of claim 2, further comprising:

an assigning means, in communication with said allocation means, for assigning a resource throttling value to each function waiting in the queue to be executed, wherein the throttling value determines the reduction of the resource allocated to each of the functions.

7. The apparatus of claim 1, wherein:

the allocation of the available resource to the functions waiting in the queue is conducted to optimize the amount of the resource assigned to these functions.

8. The apparatus of claim 1, wherein:

the allocation of the available resource to the functions waiting in the queue is conducted to optimize a combined number of instances of each function concurrently executed.

9. An apparatus for allocating a processing resource to functions in a queue waiting to be executed, comprising:

a capacity determining means for determining an amount of the processor resource available to be assigned;

a load determining means for determining an estimate of an amount of the resource needed for each function waiting in the queue to execute;

an allocating means, which receives information from said capacity determining means and said load determining means, for allocating the available resource to the

functions based on a hierarchical priority scheme, wherein

said load determining means calculates a product, for each of j instances of k functions, obtained by:

(a) estimating the amount of resource needed to support the execution of the j^{th} instance of the k^{th} function;

(b) assigning a value of either zero or one to a multiplicand associated with the j^{th} instance of the k^{th} function; and

(c) multiplying the estimated amount of resource needed to support the execution of the j^{th} instance of the k^{th} function by its associated multiplicand and assigning the result to the product associated with the j^{th} instance of the k^{th} function; and

said load determining means calculates a sub-total sum, for each of the j instances, obtained by:

(d) summing together the products associated with each of the k functions of the j^{th} instance; and

(e) adding an estimate of the resource needed to support background processing associated with the j^{th} instance to the sum of the products associated with each of the k functions of the j^{th} instance and assigning the result to the sub-total for the j^{th} instance.

10. The apparatus of claim 9, wherein:

the multiplicand value associated with the j^{th} instance of the k^{th} function is determined according to the hierarchical priority scheme.

11. The apparatus of claim 9, wherein:

said load determining means repeats the steps (a) through (e), recited in claim 19, for each of a number of sequential time periods; and

said allocating means reallocates the available resource to the functions in each of said time periods based on a hierarchical priority scheme.

12. The apparatus of claim 11, wherein:

said load determining means establishes a variable length time period that is no longer than the period needed to execute any one of the j instances of the k functions that are executing concurrently.

13. The apparatus of claim 11, further comprising:

for each of the j instances of the k^{th} function, said prioritization means assigns increasingly higher priority in accordance with an increasingly greater number of time periods that have passed since the j^{th} instance of the k^{th} function was last executed.